

CLEANING WIPE HAVING WATER STAINING RESISTANCE

The present invention relates to a sheet material - a wipe
- for cleaning a surface, leaving a water-resistant layer.

5 In particular it relates to a wipe which is impregnated
with a cleaning composition which reduces or prevents the
formation of water stains.

It is known that if aqueous liquid compositions
10 (hereinafter collectively called "water" for convenience),
collect on wooden surfaces, especially certain lacquered
or varnished wooden surfaces, it may cause water staining.
The water staining may be in the form of white rings.
Consequently, any water on such surfaces is generally
15 removed as soon as possible. However, if the water has
contacted the surface for too long, water staining may
occur. Once it has occurred it is known to try to mask,
reduce or remove it, using specialist procedures or
chemical agents. Drastic measures may sometimes be
20 undertaken, for example, removing the stained region and
exposing fresh unstained material beneath, then restoring
any surface coating. If chemical agents are used to mask
or remove the staining, the chemical agents may be toxic
and environmentally unsafe, and frequently the masking or
25 stain removal is not complete.

Commercially available cleaning compositions are not
perceived to prevent water staining and there are
indications that some may even promote water staining.

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It is preferable to prevent staining of a surface caused
by contact with water, than to seek to cure the problem
when it arises. It is desirable to do this in a way which

does not mask the appearance of the surface (frequently an item of furniture, for example a table, desk, chest or shelf).

5 According to a first aspect of the present invention there is provided a moist wipe for cleaning a wooden surface, the wipe comprising a sheet material pre-moistened with a liquid composition, being an aqueous emulsion comprising from 0.01 to 5% of a wax and no silicone compounds or
10 silicone compounds in an amount of less than 0.5%, in each case by weight of the total weight of the liquid composition.

By "wax" we mean a water-repellent low-melting organic
15 material useful in laying down a stable inert coating on a surface. Suitable waxes include hydrocarbons and esters of fatty acids and alcohols.

By "pre-moistened" we mean that the wipe is moistened not
20 immediately prior to its use in cleaning a surface. Generally the wipe is "pre-moistened" as part of its manufacture. Moistening a cleaning cloth during cleaning is not a "pre-moistened wipe" in accordance with this invention.

25 Percentage values quoted above denote the total complement of such components which are present; there may be more than one.

30 In use, the target surface is contacted with the moist wipe, which is drawn across the surface. It thereby cleans the surface and lays down wax onto the surface. The wax inhibits the formation of water stains on the

surface if water is subsequently contacted with the surface.

Suitably the wax is present as an emulsion in the liquid composition. Good results have been obtained in a non-ionic aqueous emulsion.

Particularly preferred as a wax in the invention is paraffin wax.

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Paraffin waxes generally have a macrocrystalline structure and consist largely of n-alkanes of formula $C_{20}H_{42}$ and upwards, with some iso- and cycloalkanes.

15 Suitably the wax is present in the composition in an amount of between 0.01% to 5%. Preferably the wax is present in an amount of at least 0.05%, and most preferably at least 1%, by weight of the total weight of the liquid composition.

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Preferably the wax is present in an amount up to 3%, and most preferably up to 1%, by weight of the total weight of the liquid composition.

25 Suitably the liquid composition is an aqueous composition that includes water in an amount of at least 50%, preferably at least 70%, and more preferably at least 80%, by weight of the total weight of the liquid composition.

30 Suitably the liquid composition is an aqueous composition that includes water in an amount of up to 98%, most preferably up to 95%, by weight of the total weight of the liquid composition.

Preferably the liquid composition includes, as a carrier and/or a cleaner, an aliphatic C₁ to C₄ alcohol, more preferably ethanol.

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Preferably the alcohol is present in an amount of at least 0.5%, more preferably at least 2%, most preferably at least 5% by weight of the total weight of the liquid composition.

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Preferably the alcohol is present in an amount of up to 20%, more preferably up to 15%, most preferably up to 10% by weight of the total weight of the liquid composition.

15 The liquid composition may also include other optional ingredients which are well known to those skilled in the art, such as preservatives, for example chlormethylisothiazoline, 1,2 - benzisothiazolinone, buffering agents and fragrances.

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The liquid composition may comprise a silicone compound in a small amount. Most preferably the liquid composition does not comprise a silicone compound.

25 Suitably the liquid composition contains an anti-static compound, preferably an anti-static amphoteric compound.

The liquid composition may contain an anti-static agent and an amphoteric surfactant, as distinct components.

30 Alternatively or additionally it may contain an amphoteric surfactant which has anti-static properties.

Suitable amphoteric surfactants which can be used in the cleaning composition include amphoteric betaine surfactants having anti-static properties.

- 5 A preferred, the amphoteric surfactant is an alkyl amino betaine or an alkyl amido betaine.

Suitable amphoteric surfactants also include cocoamides having anti-static properties, most preferably
10 polyoxyethylene-3-cocoamide.

Suitable amphoteric surfactants also include imidazoline surfactants having anti-static properties, for example sodium capryloamphopropionate (CAS No. 68877-55-4).
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Suitable amphoteric surfactants include lactamide surfactants having anti-static properties, for example Lactamide MEA (CAS No. 5422-34-4).

- 20 Particularly good anti-static results have been found with compositions containing a betaine in combination with a cocoamide.

Preferably, an anti-static compound may be present in an
25 amount of at least 0.05%, and most preferably at least 0.1%, by weight of the total weight of the cleaning composition.

Preferably, an anti-static compound may be present in an
30 amount of up to 10%, more preferably up to 5%, and most preferably up to 2%, by weight of the total weight of the cleaning composition.

Without being bound by any theory, it is believed that the water-resistance of a wooden surface may be compromised by silicone compounds, and/or by compounds used in their emulsification.

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The sheet material may be any sheet material capable of carrying and delivering the liquid composition, and may be porous, absorbent and/or fibrous in structure.

10 Preferably the sheet material is a fibrous sheet material.

The sheet material could in principle be woven, but is preferably non-woven. For example, the sheet material may include non-woven sheet materials such as melt blown,
15 coform, air-laid, bonded-carded web materials, hydro-entangled materials and combinations thereof.

Preferably, the sheet material is a non-woven fibrous sheet material comprising synthetic and/or natural fibres.

20 Most preferably, the non-woven fibrous sheet material comprises viscose and/or rayon fibres.

Typically, the sheet material (dry) has a weight of at least 20 grams per square metre (gm^{-2}), preferably at
25 least 30gm^{-2} , and most preferably at least 40gm^{-2} .

Typically the sheet material (dry) has a weight of up to 80gm^{-2} , more preferably up to 70gm^{-2} , and most preferably up to 60gm^{-2} .

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A particularly preferred sheet material has a weight of approximately 50gm^{-2} .

Preferably, the wipe has a size in the range 10 to 40cm by 10 to 40cm, more preferably in the range 15 to 35cm x 15 to 35cm.

- 5 Preferably the loading of the liquid composition on the wipe is at least 30gm^{-2} , and most preferably at least 50gm^{-2} .

Preferably the loading of the liquid composition on the
10 wipe is up to 150gm^{-2} , and most preferably up to 100gm^{-2} .

Preferably, each individual wipe is loaded with at least 3.5g of the composition.

- 15 Preferably, each individual wipe is loaded with up to 5.5g of the composition.

Most preferably each wipe is loaded with approximately 5g of the composition. Advantageously, it has been found that
20 this level of loading provides a wipe of size and grammage outlined above with sufficient moisture so that it does not dry out but which is not too wet to cause smearing in use.

- 25 In a particularly preferred embodiment each individual wipe has a size of approximately 20 x 30cm using a sheet material having a weight (dry) of 50gm^{-2} , and is loaded with about 5g of the composition.

According to a second aspect, the present invention
30 provides a packaged product comprising a substantially airtight container having a resealable opening and containing a wipe of the first aspect.

The container could be a tub or a soft-pack in the form of a pouch (hereinafter a "wrap"). Preferably, the container includes a plurality of wipes which are arranged in a generally folded configuration in a stack so that each
5 wipe can be removed from the container one at a time. Such folded configurations well known to those skilled in the art and include C-folded, Z-folded, quarter-folded configurations and the like. Each wipe may be interfolded with the wipe immediately above and below in the stack of
10 wipes so that the action of withdrawing one wipe raises a part of the wipe underneath it, to assist its removal. Alternatively the wipes may rest on each other in a stack without being interleaved.

Alternatively, wipes could be wound as a roll and
15 separated by perforated tear zones and the container could be a tub having an opening through which wipes are pulled.

According to a further aspect, the present invention provides the use of the wipe as defined hereinbefore for cleaning a surface, for example of furniture. Preferably,
20 the wipe is used to clean surfaces of glass, wood, plastics and the like. The benefit of the invention in resisting water stains is of primary value in relation to wooden surfaces, by which term we include certain lacquered or varnished wooden surfaces.

According to a still further aspect, the present invention provides a method of manufacturing a wipe as defined hereinbefore, the method comprising the steps of providing a sheet material as defined hereinbefore and as part of the manufacture of the wipe moistening the sheet material
30 with a liquid composition as defined hereinbefore.

Preferably, in the manufacturing method, a supply roll of sheet material is unwound to provide a continuously moving web of material. The web of material is saturated or otherwise impregnated with the liquid cleaning composition by any suitable means such as spraying, dipping, or the like as are well known to those skilled in the art. In a particular aspect, the web of material is passed over several perforated tubes which feed the solution into the material.

10 In another embodiment a roll or stack of wipes is put in the container dry, and the liquid cleaning composition is injected into the container, to impregnate the wipes.

In one embodiment the web of material is slit in the machine direction into multiple ribbons, each of which may be folded into the type of fold desired for the individual wipe. The web of material is slit using a cutter, as is well known to those skilled in the art.

In a related method a wide roll of material is cut into a number of shorter rolls. A plurality of such shorter rolls are unwound at the same time. If wished the longitudinal edges of the unrolling webs (the edges parallel to the direction of unrolling) are folded over against the central region of the webs. The unrolling webs are brought together in face-to-face manner and then cut at intervals, to form stacks ready to be packaged. In principle impregnation could be at any stage but in a preferred embodiment it is the individual unrolling webs which are impregnated, for example by spraying or dipping.

A resulting stack of wipes may be placed in a container, such as a plastics wrap or a tub, to provide a package of

wipes. The container provides a substantially hermetically sealed environment for the wipes to minimise the escape of the liquid composition, by evaporation or otherwise.

- 5 The invention will now be described further with reference to the following non-limiting examples.

The following materials were used in the examples:

- 10 IMS 99 - ethanol, 96% pure, from IMS (Industrial Methylated Spirits)
Proxel GXL - a liquid preservative comprising 1,2-benzisothiazolinone and sodium hydroxide, from Avecia, UK
Ultralube E 342/45 - a water based anionic emulsion of
15 paraffin wax, from Keim Additec, Germany
Rhodorsil EIP - a poly(dimethylsiloxane) which is pre-formulated with an anionic surfactant to form a slightly anionic oil-in-water aqueous emulsion having 35wt% of the siloxane, and which is available from Rhodia Chemie,
20 France.

- The wipes were of highly tangled non-woven blend of natural and man-made fibres and are sold as DEXTER 12106, by Alstrom-Dexter. The wipes were of grammage 50gm^{-2} , and
25 individual wipes were rectangles of size approximately 20cm x 30cm. The wipes were pre-moistened with the liquid cleaning compositions defined below. The loading of the compositions was 5g per wipe. This was sufficient to fully impregnate the wipes.

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Wipes A were pre-moistened with Formula A below.

FORMULA A

Component	%w/w
Deionized water	92.39
IMS 99	6.7
Ultralube E 342/45 Wax Emulsion	0.56
Prolemon Fragrance	0.2
Proxel GXL	0.15

Wipes B were of the same non-woven material impregnated
5 with Formula B, a control composition comprising the
following ingredients.

FORMULA B

Component	%w/w
Deionized water	91.55
IMS 99	6.5
Proxel GXL	0.15
Prolemon Fragrance	0.2
Sodium capryloamphopropionate	0.3
Lactamide MEA	0.3
Rhodorsil EIP	1.0

10 Wipes C were PLEDGE (RTM) cleaning wipes from SC Johnson.
These are believed to be impregnated with water, solvent
and approximately 7% wt/wt of silicone compound(s).

The effect of using Wipes A, B and C were also compared
15 with the effect of not wiping the surface to be tested.

The following procedure was used:

A sanded wooden surface painted black to aid visual assessment and with a shellac coating was prepared by cleaning and drying until no moisture was present on the surface. A shellac coating was used as such surfaces are known to give white water stain marks when contacted with water for a prolonged period, and left untreated. The surface was marked such that it was divided into equal rectangular sections, using masking tape. Different sections were tested either with Wipes A, B and C or without using a wipe. For sections tested by wiping with Wipes A, B and C the following protocol was used. Each section of the surface was wiped with a wipe by moving the wipe up and down the rectangular section five times, then moving the wipe left and right across the rectangular section five times, ensuring complete coverage of the section. The sections that had been wiped were then left for 1 hour, before one millilitre of deionised water at 5°C was pipetted onto all of the rectangular sections, so as to form a small pool of water in the centre of each section. 100 ml glass beakers were then filled with 75 ml of tap water and one ice cube, and a beaker placed over each of the pools of water on each section of the surface, ensuring that all the water was enclosed underneath the beaker.

The pools of water covered by the beakers were left for 7 hours, before the beakers were removed from the surface. The remaining water on each of the sections was removed as follows: a clean dry dusting cloth was wrapped around a rubbing block and, using firm strokes, wiped on each section eight times in a downward direction, then a second clean duster was wrapped around a rubbing block and wiped

across each section eight times horizontally across each section. The surface was then left overnight (for a minimum of 16 hours) for any water stains to fully form.

- 5 The intensity of any water stains formed was evaluated by using the following method:

A panel of people using a blind scoring system was assembled. In the scoring system, 0 represented no staining and 4 represented severe staining of each rectangular section of the surface. Standard water staining marks were available for reference to the panel. The number of panellists was sixteen panellists per rectangular section tested, and each surface tested had two rectangular sections wiped by a Wipe A, two rectangular sections wiped by a Wipe B, and two rectangular sections wiped by a Wipe C, and two control rectangular sections which were not treated before the addition the water. Furthermore, two surfaces were tested in the above manner, to repeat the experiment.

In each evaluation of each rectangular section, it was ensured that each member of the panel was standing in exactly the same position, so the board was always viewed under the same lighting conditions.

The average of the experiments are shown in Table 1 below.

Test Method	Average Score - 0 to 4 (0 = no marking, 4 = severe watermarking)
Wipe A	0.66
Wipe B	1.24
Wipe C	3.34
Untreated surface	1.15

The results show that pre-treatment of a surface by wiping with pre-moistened Wipes A showed an excellent preventive effect in relation to water staining. The surface treated with Wipes B, in which the composition contained a small
5 loading of a silicone compound instead of a wax emulsion, showed a markedly lower effect than Wipes A in preventing white water stains, and slightly increased water staining compared with an untreated surface. Wipe C, believed to have a much higher silicone loading, showed considerably
10 increased water staining, in these tests.